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**Notice of Allowability**

Application No.

10/502,421

Examiner

John D. Lee

Applicant(s)

HUANG ET AL.

Art Unit

2874

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the preliminary amendment filed on July 23, 2004.
2. ☒ The allowed claim(s) is/are 10-18.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 0704
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

*John D. Lee*  
John D. Lee  
Primary Examiner

### **EXAMINER'S STATEMENT OF REASONS FOR ALLOWANCE**

The following is an Examiner's Statement of Reasons for Allowance: The documents cited on the attached forms PTO-892 and PTO-1449 represent the closest known prior art. The Examiner has carefully and thoroughly checked all of these documents and has concluded that the claims of the present application are patentably distinguishable therefrom. In particular, with respect to independent claims 10 and 17 herein, none of these documents discloses or suggests a method or apparatus for aligning the polarization axes of fiber ends of two optical polarization maintaining fibers with each other, utilizing the technique of repetitive angular step rotation of the fiber ends and imaging of each fiber end at each rotated step to determine light intensity distribution profiles along a line perpendicular to the fiber axis, and then determining (from the measured intensity distribution profiles) contrast values  $h$  for each fiber end as a function of angular position, and then using the contrast values  $h$  to appropriately rotate the facing fiber ends so as to accurately align the polarization axes thereof, while specifically positioning the observation plane during imaging so that largest possible values of contrast are obtained. The cited prior art (discussed below) discloses methods and apparatus which are somewhat similar, but none discloses or suggests the particulars specified in the instant claims. Claims 10-18 herein are, therefore, allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

Art Unit: 2874

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### **DISCUSSION OF THE CITED PRIOR ART**

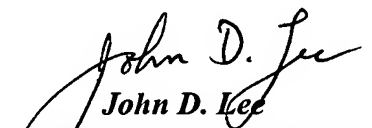
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 5,024,501 to Taya et al discloses a method for side-by-side aligning of the polarization axes of two polarization maintaining optical fibers, the method involving imaging each fiber in a series of rotational steps to determine intensity distribution profiles for the fibers, and then using the measured intensity distribution profiles to appropriately rotate the fibers so as to accurately align the polarization axes thereof side-by-side. The Taya et al method does not involve the calculation of contrast values from the measured intensity distribution profiles, and there is no suggestion of how the method could be applied to end-to-end alignment of polarization maintaining optical fibers. The U.S. Patents to Zheng et al (5,572,313), Zheng (5,758,000), and Zheng (5,850,283) disclose methods for aligning asymmetries (e.g. polarization axes) of polarization maintaining optical fibers for end-to-end splicing thereof, the methods involving rotating and imaging the fibers at discrete angular positions, obtaining intensity distribution and contrast information as a result of the imaging, and then using this information to rotate the fibers to appropriate angular positions for splicing. Although the methods of these three documents (which are commonly owned by the entity to which the present application is assigned) are quite similar to the method being claimed herein, there is no disclosure or suggestion in the

Art Unit: 2874

three documents of the precise positioning of the observation plane as set forth in the last three lines of independent claims 1 and 17. This is considered to be a patentable distinction. The three cited U.S. Patents to Kreuzer show related interferometric measurement and alignment techniques involving rotational imaging, but there is no suggestion of application of these techniques to the alignment of polarization axes of polarization maintaining optical fibers for end-to-end splicing thereof.

All of the prior art documents cited by applicant in the Information Disclosure Statement submitted on July 23, 2004, have been thoroughly considered and made of record (note the attached initialed copy of form PTO-1449). Note that the cited foreign documents correspond to the U.S. Patents to Zheng et al (5,572,313), Zheng (5,758,000), and Zheng (5,850,283) discussed above.

Any inquiry concerning the merits of this communication should be directed to Examiner John D. Lee at telephone number (571) 272-2351. The Examiner's normal work schedule is Tuesday through Friday, 6:30 AM to 5:00 PM. Any inquiry of a general or clerical nature (i.e. a request for a missing form or paper, etc.) should be directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562, to the technical support staff supervisor (Team 8) at telephone number (571) 272-1564, or to the Technology Center 2800 Customer Service Office at telephone number (571) 272-1626.

  
**John D. Lee**  
**Primary Patent Examiner**  
**Group Art Unit 2874**